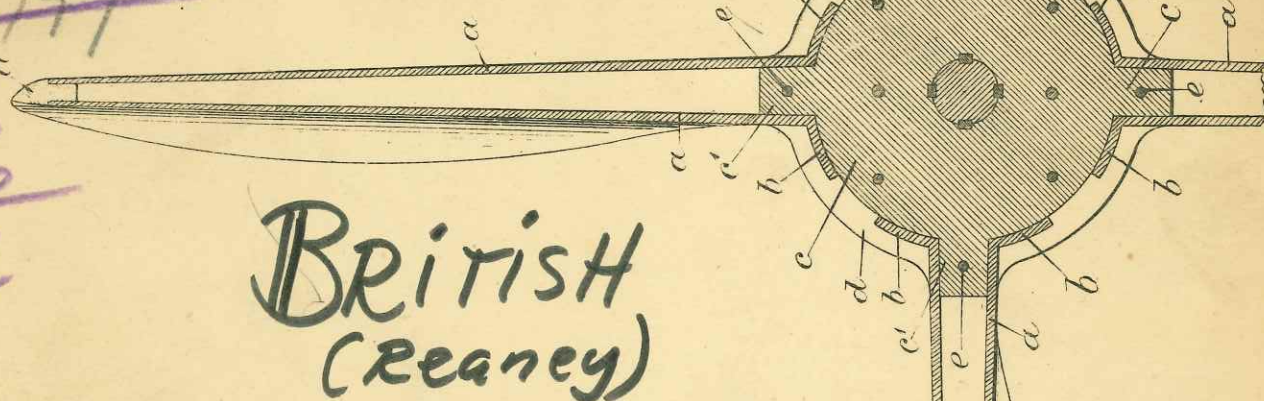


Reaney  
Compl. Spec.

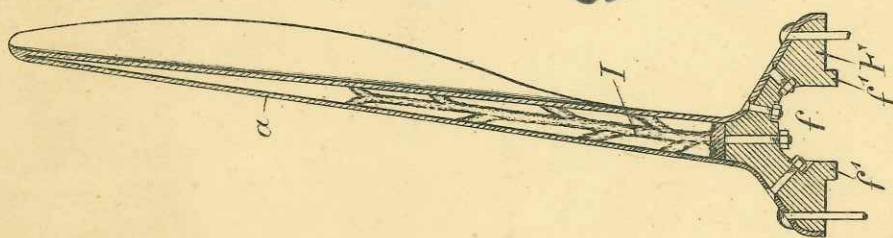
~~115-46~~  
~~170-177~~

Fig. 2.



BRITISH  
(Leaney)

Fig. 1.



See Sheet 2 in 115-47

Fig. 3.

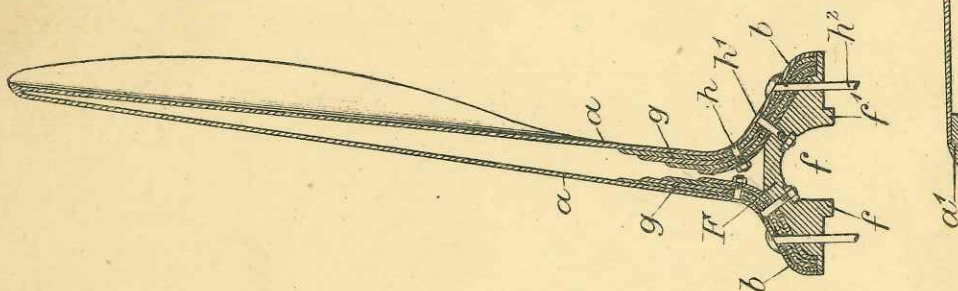
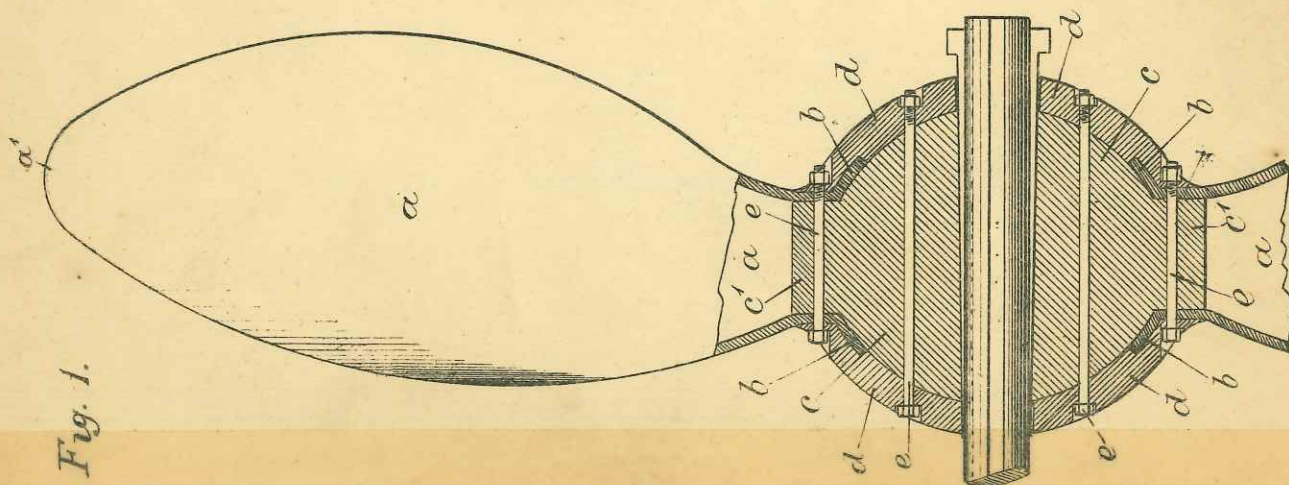


Fig. 1.



416-2224

sheet 2  
 (2 sheets)

997  
 1887

15-47

Screw Propeller  
 CLASS 115-MARINE PROPULSION  
 SCREW PROPELLERS  
 16, Form & Construction

Fig. 7.

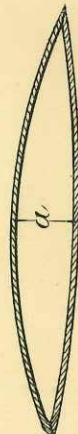
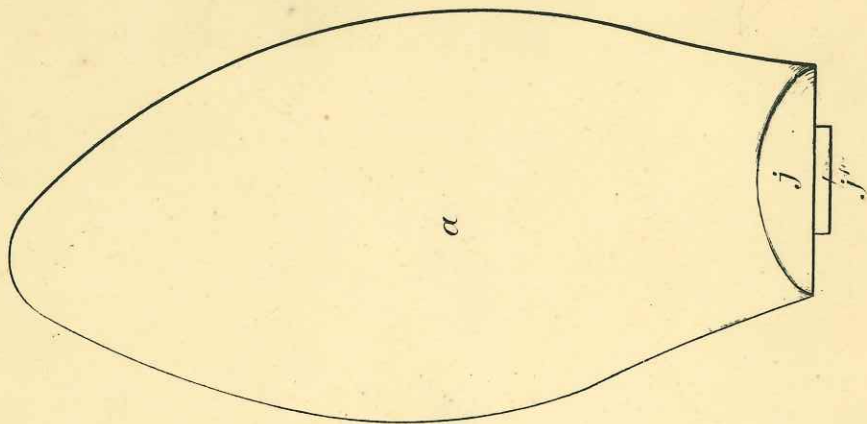
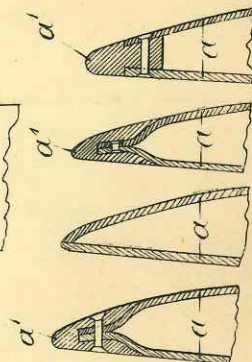
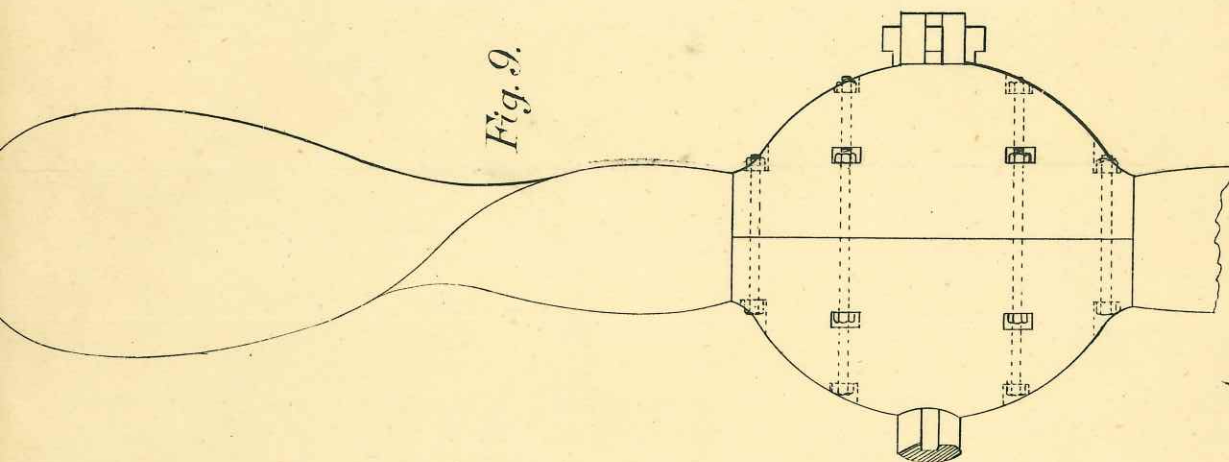


Fig. 8.

Fig. 9.



Figs. 10, 11, 12, 13.

Fig. 5.

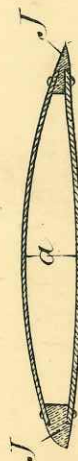
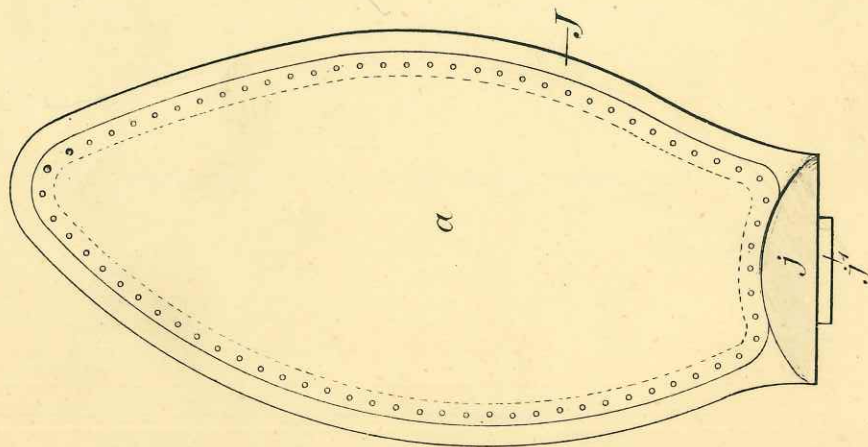


Fig. 6.



# Screw Propellers

Date of Application, 21st Jan., 1887

Complete Left, 21st Oct., 1887

Complete Accepted, 22nd Nov., 1887

---

A.D. 1887, 21st JANUARY. N° 997.

---

## PROVISIONAL SPECIFICATION.

---

### An Improved Construction of the Blades of Screw Propellers.

I, JOHN EDDON REANEY, of No. 34 Leadenhall Street, in the City of London, E.C., Manufacturer, do hereby declare the nature of this invention to be as follows:—

My invention relates to an improved construction of the blades of screw propellers and is intended to obviate the loss which according to the present methods of construction may be entailed by one of the blades turning out to be a defective casting.

5 In carrying my invention into effect, I make the skin of the propeller blade in two parts which are severally produced, preferably by rolling during which process the necessary pitch is given to them. I do not confine myself to rolling the skins inasmuch as the particular grain or nature of the metal to be used may render the selection of some other well known method of shaping metals preferable.

10 The junction of the two skins may be effected in any convenient way, as by rivetting along the edges, and guarding the double edges by a coping strip which would present a sharp edge to the water and make continuous surface with the blade.

15 The junction of the blade with the boss is effected by means of bolts and holding rings or plates, or their equivalent. The skins of the blade are bent right and left and the surface of the boss shaped to receive them. The skins are thickened gradually and considerably where they contact with the propeller boss to enable them to successfully resist the shearing strains which would be felt along these lines.

Dated this 21st day of January 1887.

20

PHILLIPS & LEIGH,  
Agents for the Applicant.

*Reaney's Improved Construction of the Blades of Screw Propellers.*

## COMPLETE SPECIFICATION.

## An Improved Construction of the Blades of Screw Propellers.

I, JOHN EDDON REANEY, of No. 34, Leadenhall Street, in the City of London, E.C., Manufacturer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

My invention relates to an improved construction of the blades of screw propellers. 5

It has hitherto been the practice to produce the blades of screw propellers by casting them, and this method of making them has been attended with the following sources of loss and inconvenience.

1. In spite of careful melting and pouring, blow holes and other blemishes have constantly formed in the casting, to the extent of rendering it worthless for the purpose for which it was cast and reducing its value to that of scrap metal. 10

2. Cast blades have necessarily been made solid partly for the sake of securing the necessary degree of rigidity, and partly because the production of a hollow blade by casting is practically impossible. The making of them solid has entailed the presence of a weight of metal which is excessive in view of my present invention. 15

3. The considerable weight of a cast propeller has practically interdicted the use in this branch of manufacture several known bronzes and alloys in spite of the practical advantages derivable from density capacity for resisting shearing and torsional strains, and corrosion, because of their high price as compared with other and less durable alloys. 20

Now, according to my invention I make the skin of the blade in two halves, which are after they have been bent to the desired pitch are carefully united along their edges. The blade is then bolted to the boss in any convenient way.

I do not confine myself to any particular method of imparting the proper pitch to the half blade, but I find that a process of pressing them between dies yields satisfactory results. 25

The half blades may be made much thicker at their root than at their tip and for this purpose I make use of eccentric rollers.

The necessary union of the two half blades along their edges may be effected by brazing, burning, or rivetting, and there may be incorporated with them along their edge a coping strip, or an equivalent frame of the proper pitch and size may be made in one piece with the boss. 30

For the purpose of effecting a proper junction between blades made as above described and the boss I may form strong flanges of the necessary thickness on the root of each half blade by which the blade can be bolted to the boss, or suitable clamps may be used. 35

Additional plates may be used between the root and flange on the one side, and the boss on the other, or a metal tree projecting from the boss may be led up the cavity of a blade, the tops of its branches being in touch with the inner surfaces of said blade. 40



*Reaney's Improved Construction of the Blades of Screw Propellers.*

In order that my invention and the means by which the same is to be carried into practical effect may be thoroughly understood I will now describe the same in detail reference being had to the accompanying figures which are to be taken as part of this specification and read therewith.

- 5 Fig. 1 is a part sectional front elevation of a four-blade propeller illustrating a method of attaching blades made according to my invention to the boss.

Fig. 2 is a sectional side elevation corresponding with Fig. 1.

Figs. 3 and 4 are sectional elevations illustrating two methods of strengthening the roots of propeller blades.

- 10 Fig. 5 is a front elevation of a blade made by rivetting the half blades upon a frame formed in one piece with the boss.

Fig. 6 is a plan corresponding therewith.

Fig. 7 is a front elevation of a blade.

Fig. 8 is a plan corresponding therewith.

- 15 Fig. 9 is a side elevation illustrating a method of clamping two blades to a boss.

Figs. 10 to 13 are detail sectional elevations illustrating different methods of effecting a union between two half blades along their edges.

The metals I make use of for the manufacture of the metal plates the union of which constitute the blades of my invention are iron steel bronze or other metallic alloy although I wish it to be distinctly understood that I do not confine myself to any one in particular, inasmuch as my improved method of making propeller blades allows me a larger range of metals to select from without be it said overstepping the limits of economical production than has hitherto been at the command of the manufacturer.

- Referring to Figs. 1 and 2, *a, a*, are a pair of half blades. They are rolled taper 25 from their roots to their tips, and have flanges *b, b*, formed upon them of a shape adapted to bed down truly upon the boss *c*, upon which extensions *c'*, one to each blade, are formed of a suitable cross section to accurately fill the throat of the blade.

- The union between the edges of the two half blades *a* is shewn as effected by the insertion of a strip *a'* rebated to receive the edges of the half blades to which it may 30 be brazed or otherwise amalgamated therewith; and the respective surfaces of which it continues till they meet in an edge formed on it.

The cavity of a blade may be filled with Val de Travers cement or other suitable substance.

- I provide clamps *d* of a suitable contour to bed down upon the flanges *b* and the 35 boss *c* and up against the roots of the blades and pass screw bolts *e* through the several parts in proper number for the purpose of uniting boss clamps and blade into practically a solid piece. The half blades may be made as thick at their roots as may be desired and then connected to the boss in the ordinary manner.

- Referring to Fig. 3, the half blades *a, a*, are of equal thickness throughout, their 40 union along their outer edge being effected by burning or analogous process.

*F* is a packing piece adapted by means of a cavity *f* and snugs *f'* and corresponding ridge and recesses on the boss to fit the latter without the risk of moving along the same.

- The outer surface of the packing piece is gradually sloped and returned towards the 45 boss, and the flanges *b b* of the half blades shaped to correspond therewith.

A series of strengthening plates *g* is inserted between the packing piece and each half blade. The plates of each series vary in length after the manner of the plates of a waggon spring, the longest being next the half blade and the shortest next the packing piece.

- 50 Bolts *h* are passed through the respective half blades and the series of strengthening plates; the blade is held to the packing piece by bolts *h'* and further bolts *h''* are provided for fixing the blades to the boss.

- Referring to Fig. 4 the plates *g* of Fig. 3 are replaced by a metal tree I 55 independently bolted to the packing piece *F*. It is continued up the cavity of the blade, its branches *i* being in touch with the blades. The method of fixing a blade made as illustrated in Fig. 4 is the same as illustrated in the previous figure and described therewith.



*Reaney's Improved Construction of the Blades of Screw Propellers.*

Referring to Figs. 5 and 6 J is a frame of the same form as the edge of a blade formed in one piece with the boss. It is rebated in the same way as the strip  $a^1$  illustrated in Fig. 2 and described therewith. The half blades are rivetted to the inner tongue of the frame.

The bottom of the frame is extended into a concave  $j$  of suitable thickness from which projects two stout snugs  $j^1$  both of them adapted to bed close upon and into the boss to which the concave may be clamped or bolted in any convenient way e.g., as illustrated in Figures 1 or 3.

Referring to Figs. 7 and 8, the blade illustrated differs only from that illustrated in the two figures last described, in having the union between two half blades effected by brazing.

Fig. 9 is a side elevation illustrating the method of clamping and bolting shewn in detail in Fig. 1.

Fig. 10 illustrates the union of two half blades by a coping strip, rivetted thereupon.

Fig. 11 illustrates the union of two half blades along their edge by brazing.

According to the method illustrated in Figure 12 the half blades are rivetted and the coping strip is afterwards brazed to the blade.

Fig. 13 illustrates the union of two half blades by means of a rebated strip and rivets.

It is evident that the methods of effecting the aforesaid union may be varied according to circumstances, without departing from my invention.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. The combination of two metal plates properly shaped and pitched for the purpose of producing a propeller blade, and adapted to be fixed upon the boss of a screw propeller.

2. The combination of two half-blades; a metal strip adapted to make continuous surface with them along their edge; and strengthening plates and flanges; substantially as described with reference to the accompanying figures.

3. The combination of two half-blades united along their outer edges; flanges adapted to bed down upon the boss; extensions of the boss entering the cavity of the blade; and cramps; substantially as described with reference to the accompanying figures.

Dated this 21st day of October 1887.

PHILLIPS & LEIGH,

Patent Agents,

22, Southampton Buildings, Chancery Lane, W.C.,

Agents for the Applicant.

LONDON: Printed for Her Majesty's Stationery Office,

By DARLING AND SON.

1887.